§103(a) as unpatentable over Nikitin et al in view of Elton '165, Platzer and further in view of Breitenbach et al (U.S, 4,785,138); Claims 1, 22, 23, and 40-45 were rejected under 35 U.S.C. § 103(a) as unpatentable over Nikitin et al in view of Elton '165 and Messenger (U.S. 3,908,161); Claims 1, 24-37, 39, 50, 53, and 57-60 were rejected under 35 U.S.C. § 103(a) as unpatentable over Nikitin et al in view of Elton '165 and Baker et al (U.S. 4,948,209).

In response to the objection to the Abstract, an Abstract is provided herewith. In response to the objection to the specification, in the specification at page 5, lines 1-6, Applicants disclose that the conductivity of the two semiconducting layers, first layer and second layer, respectively, is sufficient to substantially equalize the potential along each layer. Further, at page 5, lines 20-23, it is disclosed that the layers of the conductor are arranged to adhere to each other even when the conductor is bent. Moreover, it is well known in the art that two layers in contact having a sufficient conductivity share the same potential. Therefore, the conductor and the first layer, which are in contact and have a good conductivity, inherently have the same potential, and thus, it is respectfully submitted that the specification supports the claimed subject matter of Claim 2 as discussed above.

In response to the rejection of Claim 2 under 35 U.S.C. § 112, first paragraph, as containing subject matter which "was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention," Applicants respectfully submit that the limitation of Claim 2 is inherent for the cable of the present invention as discussed above.

Further, the outstanding Office Action rejects Claim 2 because:

The specification does not define where, in what direction and with respect to what the corresponding potentials of the conductor and the first layers being considered.[1]

It appears that the outstanding Office Action confuses the meaning of an equipotential surface, a potential, and a voltage. As described for example in Halliday, Resnick, and Walker, in Fundamentals of Physics, 5th edition, part 3, chapter 25 starting at page 601, a potential is an absolute value which cannot be measured, and therefore is meaningless to measure the potential relative to another object. A voltage is a quantity that describes a difference in potential of a point relative to another point and therefore, for a voltage, a point of reference is necessary. Further, an equipotential surface is defined as an imaginary or real surface whose points have the same potential and therefore, the equipotential surface cannot be defined relative to another object. Even more, the potential is a scalar quantity and therefore no direction can be associated with the potential of a surface. Accordingly, the above rejection is respectfully traversed.

Claims 1, 6, 8, 10, 12, 18, 20, 21, 25, 40, 41, and 54 have been amended to address the rejection of Claims 1-55 and 57-60 under 35 U.S.C. § 112, second paragraph. Further, Claims 1, 10, and 54 have been amended to correct minor informalities. No new matter has been added. It is respectfully submitted that Claims 1-55 and 57-60, as amended, comply with 35 U.S.C. § 112, second paragraph. However, if the Examiner disagrees, the Examiner is invited to telephone the undersigned so that mutually agreeable claim language may be identified.

Briefly recapitulating, amended Claim 1 is directed to an electric power plant having at least one alternating current electric machine designed to be connected directly to the distribution or transmission network and which has at least one electric winding. The winding of the machine has at least one electric conductor, a first layer with semiconducting properties

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[1]Outstanding Office Action, page 3, lines 6-7.

surrounding the conductor, a solid insulating layer surrounding the first layer, a second layer with semiconducting properties surrounding the insulating layer, and auxiliary power means configured to provide an auxiliary power.

Nikitin et al, as recognized in the outstanding Office Action at page 5, lines 9-12, fails to disclose a winding having a conductor, the first layer with semiconducting properties surrounding the conductor, the solid insulating layer surrounding the first layer, the second layer with semiconducting properties surrounding the insulating layer, and the auxiliary power means arranged to provide auxiliary power. In fact, Nikitin et al does not disclose a high voltage cable at all, but merely includes so-called high voltage elements 6 which are half windings of a solid conductor accommodated in insulation sleeves 14, for example in Figure 3, having hollow projections 15 which receive or accommodate a thermosetting material. It is unclear how the device in Nikitin et al is manufactured or what components make up the various parts. The reference simply describes half windings located in an insulation sleeve 14 with a dielectric oil-separating cylinder 4, arranged between the two half-windings 7 and 8 of the high-voltage elements 6.

Further, Nikitin et al does not disclose an alternating current electric machine 1 designed to be connected directly to a distribution or transmission network as asserted in the outstanding Office Action at page 5, lines 6-7. Nikitin et al states

> The provision of a step-up transformer involves considerable expenditures moreover, while in operation, such a transformer accounts for certain power losses ... One of the ways to raise voltage across the stator winding is to manufacture the stator winding from high-voltage cable.[2]

There is no indication that in Nikitin et al the alternating current electric machine is to be directly connected to the distribution or transmission network, but rather, Nikitin et al

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[2]Nikitin et al, column 1, lines 20-29.

suggests increasing the voltage across the stator for reducing a voltage across the step-up transformer, and therefore reducing the losses associated with the transformer.

Elton '165 is asserted for its teaching of an electric cable 100 having a first layer 104 with semiconducting properties surrounding a conductor 102 having a number of conductive elements in electric contact, a solid insulating layer 106 surrounding the first layer, a second layer 110 with semiconducting properties surrounding the insulating layer and connected to the earth for the purpose of prohibiting development of the corona discharge.

Elton '165 is a divisional of Elton et al (US 4,853,565 herein referred as Elton '565). The invention of Elton '565 is about an insulator material, namely a pyrolized glass fiber layer that may be used in a variety of applications. For example, Elton '565 describes surrounding conventional bar-type windings of an electric machine with a layer of pyrolized glass fiber in electrical contact with ground to minimize corona discharge by providing a path to ground to bleed off built up charges.[3] Elton '565 also describes using a semiconducting pyrolized glass fiber layer to equalize the potential on the exterior of the insulator of a cable.[4] Elton '565 describes yet another application of the pyrolized glass fiber layer as a way to protect electronic components by coating the exterior of a housing with the semiconducting pyrolized glass fiber material.[5]

However, Elton '565 does not teach or suggest that the cable shown in Figure 7 could be used as a winding in an electric machine. On the other hand, the cable in Elton '565 is but one of several exemplary applications of the pyrolized glass fiber layer described in Elton '565. It appears to be completely coincidental that Elton '565 uses a winding (also referred to

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[3]Elton et al., column 5, lines 49-63.

[4]Column 7, lines 34-37.

[5]Column 7, lines 48-column 8, line 5.

in Elton '565 as an "armature bar") and also a cable (as well as a chassis for an electric circuit) as exemplary uses for the pyrolyzed glass insulator material. There is nothing in Elton '565 to suggest a desirability of using the cable embodiment shown in Figure 7 of Elton '565 as a substitute for a conventional bar-type winding in an electric machine.

Elton '565 recognizes that in the end-winding region just outside of the stator of an electric machine, there will be problems caused by strong electric fields. As a solution, Elton '565 describes using a known grading near the stator to allow some of the accumulated charge to bleed off to the stator, thus reducing the risk of arcing, but Elton '565 offers no other solutions to the problems in the end-winding region. The strong electric fields will be present throughout the end-winding region, not just near the stator. The grading used in Elton '565 will help to lessen the effects of the strong electric fields near the stator, but will not address the problems in the end-winding region away from the stator. Elton '565 uses rigid bar-type windings which are able to withstand mechanical stresses caused by induced fields between the windings in the end-winding region, where electromagnetic fields are not contained in the winding. The mechanical rigidity of the bar-type windings suppress the amount of vibration in the end-winding region that would otherwise be present. The fact that a grading system is used to lessen the end-winding region problems near the stator in Elton '565 is further evidence that Elton '565 does not suggest using the cable of Figure 7 as a winding of a machine, since such a cable would not have a grading.

The "invention" in Elton '565 and therefore Elton '165, is the pyrolyzed glass fiber layer. Elton '565 describes a process of immersing the winding portions in a bath of resin and

vacuum pressure impregnating (VPI) the resin in the winding.[6] The VPI process results in a cured resin having no voids or gaps between layers.[7]

The cable shown in Figure 7 of Elton '565 includes two pyrolyzed glass fiber layers, layers 104 and 110.

> The internal grading layer 104 is a semi-conducting pyrolyzed glass fiber layer as disclosed herein. . . . An insulation 106 surrounds internal grading layer 104. On the external surface of insulation 106, a semi-conducting pyrolyzed glass fiber layer 110 equalizes the electrical potential thereon.[8]

As further evidence that the cable shown in Figure 7 Elton '565 would not be suitable as a winding in an electric machine, having two pyrolyzed glass fiber layers would cause the cable to be prohibitively stiff for winding around the stator. It may be possible to VPI the entire stator in a large resin bath after it had been wound with a flexible cable. However, such a process would not be feasible to produce both the internal grading layer 104 and the external layer 110 since an insulation layer 106 surrounds the internal grading layer 104 and both layers 110 and 104 would need to be exposed to the resin. Accordingly, while Elton '565 describes how to provide a pyrolyzed glass fiber layer for a bar-type winding, Elton '565 does not teach or suggest that the cable of Figure 7 could be used for such a purpose, especially since the cable in Elton '565 would be stiff, not flexible.

Platzer is asserted for its teaching of an auxiliary power means 5 arranged to provide auxiliary power for the purpose of providing the synchronous generator with a self-excitation system without use of a current transformer or a pilot exciter. However, Platzer does not teach or suggest what is also lacking in Nikitin et al and Elton '165, namely, an alternating current electric machine designed to be connected directly to a distribution or transmission

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[6] See Elton, column 4, lines 23-25.

[7] See Elton, column 4, lines 27-30.

[8] See Elton, column 7, lines 19-26.

network and a winding of the alternating current electric machine having at least one electric conductor, a first layer with semiconducting properties surrounding the electric conductor, a solid insulating layer surrounding the first layer, and a second layer with semiconducting properties surrounding the insulating layer as required by independent Claim 1. Therefore, is respectfully submitted that no matter how the applied references are combined, the combination fails to teach or suggest the invention defined by Claim 1, or Claims 2-5, 7-8, dependent therefrom.

Independent Claims 10 and 54 include limitations similar to those discussed in regard to Claim 1. Therefore, the rejection of independent Claim 10, as well as Claims 12-21, 38, 46-49, 51, and 52, dependent therefrom and independent Claim 54, and Claim 55, dependent therefrom, is respectfully traversed for the same reasons discussed above in regard to Claim 1.

Regarding the rejection of Claim 6 under 35 U.S.C. § 103(a) as being unpatentable over Nikitin et al in view of Elton '165, Platzer and Elton '116, Elton '116 is asserted for its teaching of a winding having two adjacent layers 12 and 13 of a substantially same coefficient of thermal expansion. However, Elton '116 does not teach or suggest what is also lacking in Nikitin et al, Elton '165 and Platzer, namely, an alternating current electric machine designed to be connected directly to a distribution or transmission network and a winding in the alternating current electric machine having at least one electric conductor, a first layer with semiconducting properties surrounding the electric conductor, a solid insulating layer surrounding the first layer, and a second layer with semiconducting properties surrounding the insulating layer, as required by independent Claim 1. Consequently, it is respectfully submitted that Claim 1, as well as Claim 6, dependent therefrom, patentably defines over Nikitin et al in view of Elton '165, Platzer and Elton '116.

Regarding the rejection of Claim 9 as being unpatentable over Nikitin et al in view of Elton '165, Platzer and Shildneck, Shildneck is asserted for its teaching of an insulated conductor being flexible so it can be bent when forming the winding of a dynamo-electric machine. However, Shildneck does not teach or suggest what is also lacking in Nikitin et al, Elton '165 and Platzer, namely, an alternating current electric machine designed to be connected directly to a distribution or transmission network and a winding of the alternating current electric machine at least one electric conductor, a first layer with semiconducting properties surrounding the electric conductor, a solid insulating layer surrounding the first layer, and a second layer with semiconducting properties surrounding the insulating layer, as required by independent Claim 1. Consequently, it is respectfully submitted that Claim 1, as well as Claim 9, dependent therefrom, patentably defines over Nikitin et al in view of Elton '165, Platzer and Shildneck.

Regarding the rejection of dependent Claim 11 as being unpatentable over Nikitin et al in view of Elton '165, Platzer and Breitenbach et al, Breitenbach et al is asserted for the teaching of a winding comprising cables protected by a sheath 10. However, Breitenbach et al does not teach or suggest what is also lacking in Nikitin et al, Elton '165 and Platzer, namely, an alternating current electric machine designed to be connected directly to a distribution or transmission network and a winding of the alternating current electric machine having at least one electric conductor, a first layer with semiconducting properties surrounding the electric conductor, a solid insulating layer surrounding the first layer, and a second layer with semiconducting properties surrounding the insulating layer, as required by independent Claim 1. Consequently, it is respectfully submitted that Claim 1, as well as Claim 11, dependent therefrom, patentably defines over Nikitin et al in view of Elton '165, Platzer and Breitenbach et al.

In regard to the rejection of Claims 1, 22, 23, 40-45 under 35 U.S.C. §103(a) as being unpatentable over Nikitin et al in view of Elton '165 and Messenger, the combination of Nikitin et al and Elton '165 have been discussed above. Messenger is asserted for its teaching of having an auxiliary power means for providing an auxiliary power to a synchronous generator 10. Aside from auxiliary power generator, there is nothing in Messenger that would cure a lack of an alternating current electric machine designed to be connected directly to a distribution or transmission network and a winding of the alternating current electric machine having at least one electric conductor, a first layer with semiconducting properties surrounding the electric conductor, a solid insulating layer surrounding the first layer, and a second layer with semiconducting properties surrounding the insulating layer, as required by independent Claim 1. Consequently, it is respectfully submitted that no matter how Nikitin et al is combined with Elton '165 and Messenger, the proposed combination fails to teach or suggest the invention defined by independent Claim 1, as amended, or Claims 22, 23, 40-45, dependent therefrom.

In regard to the rejection of Claims 1, 24-37, 39, 50, 53, and 57-60 under 35 U.S.C. § 103(a) as being unpatentable over Nikitin et al in view of Elton '165 and Baker et al, the combination of Nikitin et al and Elton '165 has been discussed above. Baker et al is asserted for its teaching of having auxiliary power means for providing a synchronous generator with auxiliary power. Aside from the auxiliary power source, there is nothing in Baker et al that would cure the above described deficiency regarding the proposed combination of Nikitin et al and Elton '165. Consequently, it is respectfully submitted that no matter how Nikitin et al is combined with Elton '165 and Baker et al, the proposed combination fails to teach or suggest the invention defined by independent Claim 1, as amended, or Claims 24-37, 39, 50, 53, dependent therefrom. Also, independent Claim 54 includes similar limitation with those

already discussed in regard to Claim 1 and therefore, it is believed that independent Claim 54 and Claims 57-60, dependent therefrom, patentably distinguish over the combination of Nikitin et al with Elton '165 and Baker et al, as discussed above in regard to Claim 1.

Consequently, in view of the present amendment, and in light of the foregoing comments, it is respectfully submitted that the invention defined by Claims 1-55 and 57-60, as amended, is definite and patentably distinguishing over the asserted prior art. The present application is therefore believed to be in condition for formal allowance and an early and favorable reconsideration of this application is therefore requested.

Respectfully submitted,
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IN THE CLAIMS

Please amend Claims 1, 6, 8, 10, 12, 18, 20, 21, 25, 40, 41, and 54 as shown below.

1. (Twice Amended) An electric power plant comprising at least one alternating current electric machine [of alternating current type] designed to be connected directly to a distribution or transmission network and comprising at least one electric winding, wherein the winding of the machine comprises at least one electric conductor, a first layer with semiconducting properties surrounding the conductor, a solid insulating layer surrounding the first layer and a second layer with semiconducting properties surrounding the insulating layer, and auxiliary power means arranged to provide an auxiliary power.

6. (Twice Amended) The plant as claimed in claim 1, wherein at least two adjacent layers of the winding have substantially the same[, relatively large] coefficients of thermal expansion.

8. (Twice Amended) The plant as claimed in claim 1, wherein each of said layers has a contact surface and each said layer is firmly joined to an adjacent layer along substantially its entire contact surface.

10. (Twice Amended) An electric power plant comprising at least one alternating current electric machine [of alternating current type] for direct connection to a distribution or transmission network and comprising at least one magnetic core and at least one electric winding, formed of a cable comprising one or more current-carrying conductors, each of said [conductor] conductors having a number of conductive elements, an inner semiconducting

layer provided around [each conductor] the conductive elements, an insulating layer of solid insulating material provided around said inner semiconducting layer, and an outer semiconducting layer provided around the [Insulating] insulating layer, and auxiliary power means for providing an auxiliary power.

12. (Twice Amended) The plant as claimed in claim 1, wherein the electric machine is a rotary electric machine and wherein [the] a stator is provided with at least two windings for different voltages, one of said windings being arranged as auxiliary power winding to generate an auxiliary power.

18. (Twice Amended) The plant as claimed in claim 12, wherein the stator includes adjacent teeth separated by a slot having a bottom and the auxiliary power winding is located in the bottom of the slot formed between [two] the adjacent stator teeth.

20. (Twice Amended) The plant as claimed in claim 18, wherein the stator includes a plurality of slots, and the auxiliary power winding is placed in [every slot in] each of the plurality of slots of the stator.

21. (Twice Amended) The plant as claimed in claim 1, wherein the electric machine is a generator having a generator winding and the auxiliary power means comprises a tapping terminal on the generator winding for tapping said auxiliary power, to form an auxiliary power source.

25. (Twice Amended) The plant as claimed in claim 24, wherein at least one of the windings of the earthing transformer includes a tapping terminal for extracting said auxiliary power.

40. (Twice Amended) The plant as claimed in claim 22, wherein the auxiliary power generator is connected to an auxiliary power busbar, and an integral motor is arranged to keep

[the] a speed of the auxiliary power generator constant when variations appear in [the] at least one of a voltage [and/or] and a frequency of [the] a supply network.

41. (Twice Amended) The plant as claimed in claim 22, wherein [the] power electronics equipment is arranged for optional control of power flow from the auxiliary power generator to an auxiliary power busbar or from the auxiliary power busbar to the auxiliary power generator.

54. (Twice Amended) An electric power plant comprising at least one alternating current rotary electric machine [of alternating current type] for connection directly to a distribution or transmission network and comprising at least one electric winding, wherein the winding of the machine is formed of at least one electric conductor, a first layer with semiconducting properties surrounding the conductor, a solid insulating layer surrounding the first layer and a second layer with semiconducting properties surrounding the insulating layer, and an auxiliary power is generated with the aid of an extra winding on [the] a stator.

IN THE ABSTRACT

(New)